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A COLLECTING EXCURSION NORTH OF THE GRAND CANYON OF THE COLORADO.

In August last Messrs. J. H. Ferriss and L. E. Daniels set out to extend the work begun by Ferriss and Pilsbry in 1906. From Bass' Camp they crossed the Grand Canyon of the Colorado; scaled the northern rim, explored and collected in the Kaibab and Kanab plateaux, finally reaching Kanab, in southwestern Utah. Beyond the Grand Canyon, where we had worked in 1906, this was all a virgin field conchologically. An account of their journey is here extracted from a letter received from Mr. Ferriss.

Friend Pilsbry:

The Arizona expedition of 1909 is in the offing, to use a nautical term. We felt worried until your letter was found at the end of the trip. There was some danger of getting lost in the desert in an effort to find us. A settler with a team from Mt. Trumbull a day ahead of us was three days without water and just about all in when he reached the Pipe Springs. We supposed you would come the back-door route by Salt Lake so that in coming or going you would pick up the Oreohelix found by Hemphill.

Unexpectedly we made the trip to Mt. Trumbull via Fredonia, Arizona and Kanab, Utah, and thus found the guide we had picked out watching for you. On a side trip I went up to the lakes in the mouth of caves along the Kanab Wash north of these villages, and from what I saw and heard it will be an interesting conchological trip along the mountains all the way to Salt Lake. It was at these cave lakes that I found *Succinea hawkinsi* of British Columbia. We heard of Oreohelix with a long nose but did not find them.

There must be a difference in the anatomy of different lots of *Succinea avara* sent in. We found it plentiful on the ant hills in the Antelope valley, a desert as dry as the St. Simon valley. Again on the hottest and dryest of mountain rock at the Hurricane Fault. Still again we found it with *Oreohelix* at the Big Springs in the Kaibab Mountains living in as moist a situation as we find *Polygyra multilineata.* These were of a different color, larger and more corpulent.

After this I hope to go into strange countries with U. S. Geological folios in addition to the contour maps, for the whole Mt. Trumbull country was of lava formation, barren of shells except the small truck. We need limestone and shelter in our business. The Hurricane Fault had lime but no shelter and was equally as barren. This Trumbull side-trip took half of our time and cost a lot of money, but we enjoyed it. We love the Mormons, at least their cooking, and I am now physically perfect until next August.

I will send you a map marking our collecting stations. There were 113 of these. Oreohelix was found at perhaps 100 stations and 80 of these are unlike any other colony in color, size or architecture, while each colony is reasonably uniform individually. We had a theory when we left the Two Springs canyon that the shells were small and dark in the higher altitudes and that they grew larger in a regular ratio as we passed to the lower levels, but in the Warm Springs Canyon the shells were largest at the upper stations and smaller at the lower. In the Snake Gulch they were smallest at the midway stations, and in Quaking Asp canyon it was a skip about between large and small. At Castle Springs, heavily shaded and in elderberry bushes, we found the largest. At Big Springs, facing the sun, moisture abundant, they were small with many albinos. Thus as to elevation, shade, moisture, soil or food we have no theory except like old-time chickens they may just happen to be large, small and middling, ring-banded, streaked or speckled. Our largest measured 30 mm. diam. and our smallest 8 mm. In the Huachucas the colonies of *Oreohelix* are of mixed forms, but the Kaibab shells are of one kind in each colony, with occasional albinos. Some of the colonies apparently divided their rock slide territory into families, designated by size or color. In one instance passing around the point of a rock, less than one hundred feet, and good traveling for snails, the colony on one side was as large again in size as those upon

the opposite side. Our prettiest shells are pure white with a green, transparent band, like Clapp's Maine find of *Helix hortensis*.

The Sonorellas were in small colonies and hard to dig. We did not find any after leaving the north rim of the Grand Canyon and the Kaibab-Powell Saddle. Powell and Kaibab plateaus are fairly level and I have never seen anything more beautiful in timber landscapes. Powell is covered with a heavy growth of large yellow pine. In the Kaibab plateau or mountains, better known in Arizona as Buckskin Mountains, blue spruce and quaking aspen with the pine lend variety to the scenery. No landscape artist in Fairmount Park could manage the grouping better than we saw it in a day and a half journey by donkey, down the Snake Gulch (known as Shinamo Canyon on the U. S. maps.)

We camped with E. W. Nelson and C. Birdsi of the biological survey of the U. S. Agricultural Department at Mt. Trumbull. Here we learned that the tufted-eared squirrel of the Kaibabs was *Sciurus alberti* var. *kaibabensis*. It is the largest American squirrel, black as silk with a white tail. A chattering chickaree is black throughout, and there are four chipmunks and a blue grouse. Deer were about as common as cattle, and as tame, for the Kaibabs are in a game preserve. The plains about Trumbull are populated with wild horses and these are common game, to be had for the catching.

Again I visited the Grotto [on White Creek, a branch of the Grand Canyon] and took more of the maidenhair fern. It seems to be a new species, and it so happens I am working at that group. The Grotto and creek have been filling up with gravel since you and I were there together. They are quite changed since our visit three years ago. From the Grotto, White creek keeps to the north and Muav to the west; heading in the saddle between Kaibab and Powell plateaus. So when you and I slept by the fire and found the colony of Sonorellas we were in the Muav Wash and more than half way to the north rim of the Grand Canyon. About a mile above our sleeping place, there is a fine trout stream (without fish) and cliffs a thousand feet high, with Sonorellas.

There were no mice this time at our old thousand-mouse camp on Shinamo creek.[1] We saw but two on the whole trip. Thus John had a fine orchard with leaves on the trees this time, also melons, sweet potatoes and common things in plenty. Their asbestos mine

[1] On the north side of the Grand Canyon, near the river.

is very promising but it is a long road to consumption for the copper. We found a half million dollar copper smelter in the Kaibabs and a saw mill, but only two men in the mountains besides the foresters, and these were at the saw mill. They had a wagon road to Fredonia. In fact you can wagon from the top of the Kaibab saddle to Fredonia or most any other place in that region. An auto was driven through from Salt Lake while we were there to Bright Angel, on the north side of the canyon across from the hotel. But from Bass Station to Trumbull, 125 miles, there will be no inhabitants through the winter, except Bass and John working out assessments on new mines.

Yours Truly,

JAS. H. FERRISS.

A NEW VARIETY OF LYMNAEA STAGNALIS.

BY FRANK C. BAKER.

LYMNÆA STAGNALIS LILLIANÆ var. nov.

Lymnæa stagnalis var., DANIELS, NAUTILUS XXII, p. 120 (1909).

Lymnæa stagnalis var., WALKER, Ann. Rep. Mich. Geol. Surv., 1908, 289, figure 63, No. 1 (1909).

Shell elongate-ovate, with short spire and elongated, narrow aperture, which is typically longer than the spire; whorls flattened, elongated, very flat-sided and sloping, especially the body whorl which is cylindrical; spire sharply acuminated; whorls $5\frac{1}{2}$ to 6; body whorl elongated, flattened, roundly shouldered; aperture long and narrow, slightly expanded; axis strongly gyrate; umbilical region with a very minute, narrow chink; sculpture and nuclear whorls as in *stagnalis appressa.*

Length, 42.00; width, 22.00; aperture length, 26.00; width, 13.00 mill.

Length, 40.00; width, 19.50; aperture length, 23.50; width, 11.75 mill.

Length, 39.00; width, 20.00; aperture length, 24.50; width, 11.00 mill.

Length, 37.50; width, 19.50; aperture length, 23.75; width, 12.00 mill.

Length, 40.00; width, 19.00; aperture length, 23.25; width, 11.50 mill.